**********FLIGHT INSTRUCTOR BULLETIN**********

BULLETIN NUMBER 5

TASK: Fuel Management

SUBTASKS: fuel Computation
Fuel Systems
Leaning Procedures

OBJECTIVE: To develop awareness and procedures to aid in managing fuel and prevent fuel starvation related accidents.

STANDARDS: N/A

CONDITIONS: N/A

DESCRIPTION: 1. The Facts

The three most useless things to a pilot is 1. runway behind you, 2. altitude above you, and 3. air in the fuel tank. An old saying that is still true today.

On the average one pilot per week will either run out of fuel or miss manage the fuel system to a point where the engine will fail resulting in an emergency approach and landing.

2. What can you do?

We offer the following information and suggestions to the flight instructor when teaching a student:

3. Fuel Computation

A. Maintain accurate flight time, power setting, and refueling records for each trip.

B. Be conservative, figure your fuel burn from start up to shut down using the in-flight fuel consumption figure.

C. Reasonably accurate fuel consumption rates (in gallons per hour) can be computed after a few flights under similar operating conditions.

D. The amount of usable fuel for your aircraft is found in the Pilot's operating Handbook.

E. Multiply the usable fuel on board your aircraft by 75% and divide the result by your previously confirmed consumption rate. This will be your SAFE FLIGHT TIME limit for the aircraft. Resolve never to exceed it.

F. When you are familiar enough with your aircraft to know exactly how much time is in your fuel tanks, plan to land with at least 1 hour of fuel remaining on board. Anything less could compromise safety.

G. Compute a reasonable time limit for your aircraft.

H. The following are some factors that must be considered in planning each flight:

a. Trip length.

b. Cruise altitude.

c. Wind direction and velocity.

CAUTION: Do not count on forecasted tailwinds when computing fuel required for the flight.

d. The number of passengers (weights plus baggage).

I. Resolve not to exceed the time limit you establish.

H. Estimate your "ETA" for each checkpoint. Be aware of your actual progress and think about landing at an alternate if you are running behind your estimated time of arrival (ETA).

4. Fuel systems.

A. Use the proper grade of aviation fuel as specified by the manufacturer for your aircraft.

B. Only use automotive grade fuel when approved.

C. Never use a lesser grade of fuel than that specified by the engine manufacturer.

NOTE: Visually check the color and cleanliness of the fuel in your aircraft by draining the fuel sumps and strainers after each fueling and during preflight inspection.

D. Do not assume your fuel quantity and quality to be correct. Always check it visually.

CAUTION: The pilot should not solely trust fuel gauges. Fuel gauges are subject to malfunction and errors.

E. Know the fuel system of your aircraft. Never operate a fuel selector without visually checking the position.

NOTE: Some aircraft have fuel selectors with a BOTH position (example: Cessna 172). The flight

instructor should from time to time have the student select a left or right tank, as appropriate, instead of leaving the selector in the BOTH position. This will teach the student how to manage fuel loads, as well as learning to operate fuel systems that do not have a BOTH position.

F. The aircraft should be "topped off" before flight unless restricted by the maximum gross weight or center of gravity limits.

NOTE: If the fuel load must be limited, an accurate measurement can be made by use of a dipstick calibrated for the aircraft.

G. Fill the fuel tanks at the completion of the flight. Condensation can occur in partially filled fuel tanks when not in use.

H. Do not reposition the fuel selector valve just before takeoff and landing. The possibility is greater that the valve may be positioned incorrectly if done during critical phases of flight.

5. Leaning Procedures

A. It is important to teach your student why you should lean the mixture. The following are some reasons to lean the mixture:

1. To improve engine efficiency and increase airspeed.

2. To provide smoother engine operation.

3. To provide greater fuel economy and longer range of operation.

4. To provide longer spark plug life with less fouling.

5. Reduce maintenance costs.

6. Performance charts are based on certain leaning procedures.

B. It is important to teach your student when to lean the mixture. The following are times that the mixture should be leaned:

1. Lean at cruise as recommended by the manufacture. Normally this is anytime the engine is producing 75% power or less.

2. During crosscountry flight for fuel savings.

3. During a high altitude takeoff. In addition the mixture should be leaned during a high altitude landing in case a go-around becomes necessary.

NOTE: Enrich the mixture during the descent enough to keep the engine running smoothly. In addition go to full rich when in the traffic pattern (or as required when landing at high elevations)